

“Attractiveness of value-based versus technology-based software-defined vehicle concepts to consumers and employees”

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ATTRACTIVENESS OF VALUE-BASED VERSUS TECHNOLOGY-BASED SOFTWARE-DEFINED VEHICLE CONCEPTS TO CONSUMERS AND EMPLOYEES

Abstract

Software-defined vehicles (SDVs) are gaining importance as a key innovation in the automotive industry, yet their value from the perspectives of consumers and employees remains insufficiently understood. This study aims to examine whether value-based SDV concepts increase perceived attractiveness compared with technology-based concepts. Randomized survey experiment was conducted through an online survey in Japan from July 23 to July 25, 2025, with 600 respondents aged 20-69, including car owners who drove at least once a month and full-time employees in the automobile, home appliance, and IT industries, selected as relevant evaluators of SDV value in market and workplace contexts. The value-based concept achieved a higher mean attractiveness score than the technology-based concept (3.375 vs. 3.132, $t(598) = 3.11$, $p = 0.002$) and a higher Top-2-Box attractiveness rate (47.7% vs. 36.5%, $\chi^2(1) = 7.73$, $p = 0.005$). Simple slope analyses yielded patterns that were directionally consistent with expectations, but the interaction effects of age and personal innovativeness were not statistically significant. These findings suggest that, in this Japanese online survey sample and under the specific stimuli used in this study, value-based SDV concept emphasizing rapid feedback incorporation and idea realization was rated as more attractive than a technology-based concept.

Keywords

SDV, branding, framing, innovation, marketing,
employees

JEL Classification

M31, O33, L62

INTRODUCTION

The automotive industry is undergoing a once-in-a-century transformation (Sugimoto, 2021). While transformations occur in various aspects such as connectivity, autonomy, shared mobility, and electrification (CASE) (Dutt et al., 2020), software is the primary driver of these transformations (Vdovic et al., 2019). Vehicle software is an intelligent digital ecosystem, essentially a “smartphone on wheels” (Vitale & Hollander, 2023). The most important emerging technology in industry today, symbolizing a shift from hardware to software, is Software-Defined Vehicles (SDV) (Madhuri & Vishnu, 2025). The implementation of SDV is essential to transform traditionally connected cars into intelligent computing platforms (Bhattacharjee et al., 2023). SDVs are crucial in managing the increasing complexity of software by centralizing computing resources and enabling flexible software updates and feature deployment (Oh et al., 2025). Therefore, SDV is not a passing trend but an irreversible innovation (Zhang et al., 2024).

Investment in in-house SDV development is an essential strategy for automakers to prevent product commoditization and differentiate themselves from their competitors (Szalavetz, 2024). However, tech-

nological superiority alone is insufficient to make this differentiation because steady technological advances often exceed consumer expectations, making the technological differences between products almost insignificant. Therefore, competition concerns concepts that define value for consumers (Kato, 2021). Even when technology is the focus, the technological concept is the source of competitive advantage (Kato et al., 2024). Consumers do not desire objective technological excellence; rather, they desire a valuable technology brand (Hamann et al., 2007). In other words, technologies that neglect this concept and claim superiority may fail to achieve broad market acceptance and sustained investment, stagnate, and ultimately disappear from the market.

However, despite the technological progress of SDVs, existing research has primarily focused on system architecture and engineering performance, while the scientific problem of how their value should be defined and communicated to key stakeholders remains insufficiently explored.

1. LITERATURE REVIEW AND HYPOTHESES

Previous studies have provided important insights into software-defined vehicles (SDVs), brand concepts, technology framing, stakeholder interpretation, and employee responses to innovation. However, these streams of research have largely developed in parallel rather than as an integrated explanation of how SDV value is perceived by both market-facing and organization-facing stakeholders. To clarify the scientific problem addressed in this study, it is necessary to connect the literature on value creation, concept framing, internal marketing, feedback-based organizational responsiveness, and innovation management, and then identify the gap concerning how SDV value is defined and communicated to key stakeholders.

Marketing research has long emphasized that the success of products and technologies depends not only on their functional performance but also on the meanings and values attributed to them by stakeholders. Gardner and Levy (1955) argue that products function as symbols, and that consumers respond to the symbolic meanings embedded in brand concepts rather than to objective attributes alone. Building on this view, Park et al. (1986) conceptualize brand concepts as cognitive frameworks that link products to specific consumer needs, such as functional, symbolic, or experiential benefits. When a clear and compelling concept is established, it serves as a foundation for brand differentiation and long-term competitive advantage. As markets mature and technologies become increasingly sophisticated, differentiation based solely on technical superiority becomes difficult.

Prior studies show that consumers rarely evaluate complex technologies based on objective performance metrics; instead, they rely on simplified value propositions that help them interpret what the technology means for their lives (Hamann et al., 2007; Kato, 2021). Recent marketing research also demonstrates that concept recall and value framing play a stronger role in shaping brand preference and loyalty than detailed technical information (Aaker & Joachimsthaler, 2000; Jeon, 2017). This perspective is consistent with value proposition research, which emphasizes that competitive advantage increasingly derives from how value is articulated rather than from technical features alone (Payne et al., 2017).

These arguments are reinforced by broader marketing theory on value creation. Service-dominant logic suggests that value is not simply embedded in products before exchange, but is realized through service, interaction, and relationships (Vargo & Lusch, 2004). In a related vein, co-creation research argues that value increasingly emerges from dialogue and interaction between firms and stakeholders rather than from a one-way, firm-centered process (Prahalad & Ramaswamy, 2004). This perspective is especially relevant to SDVs because software-based products continue to evolve after purchase and because their value depends on an ongoing relationship between stakeholders and firms. If value is co-created through interaction, then the responsiveness of firms to stakeholder input becomes a central part of what stakeholders perceive as value. In this context, SDVs can be interpreted not only as technical architectures but also as relational platforms through which firms update, refine, and personalize stakeholder value over time.

This issue becomes even more important in the context of emerging technologies. Because such technologies are abstract, future-oriented, and technically complex, their value is difficult for stakeholders to evaluate directly. Marketing research has therefore highlighted the importance of technology framing, through which firms interpret and communicate the meaning of technology in ways that resonate with stakeholder values (Topaloglu & Gokalp, 2018). Prior studies suggest that technological innovations create value only when stakeholders can interpret their meaning (Rindova & Petkova, 2007). In digital and software-driven innovations, value therefore depends not only on technical functionality but also on interpretive narratives that make the technology understandable and relevant. This perspective is particularly applicable to SDVs, whose technical advantages, such as continuous updates, scalability, and centralized computing, are not inherently meaningful to most stakeholders unless they are translated into concrete value.

Further reason why communication matters can be drawn from innovation management theory. Research on disruptive innovation and the innovator's dilemma has shown that established firms may fail even when they listen carefully to existing customers, because powerful customers often reinforce dominant performance dimensions rather than encourage alternative value definitions (Bower & Christensen, 1996). This argument is highly relevant to SDVs. If firms communicate SDVs only through conventional engineering metrics, they may remain trapped in an existing logic of competition based on technical superiority, even though the real market opportunity may lie in redefining the basis of value. In other words, firms may overemphasize technical performance that is meaningful to specialists while underemphasizing responsiveness, adaptability, and post-purchase evolution, which may be more meaningful to broader stakeholder groups. Thus, the challenge in SDV competition is not only to improve the technology itself, but also to avoid framing the technology in ways that simply reproduce incumbent industry logic.

This logic also connects to dynamic capabilities research. Dynamic capabilities theory emphasizes that firms create sustained advantage not

merely by possessing resources, but by sensing changes, seizing opportunities, and reconfiguring organizational assets in response to evolving environments (Teece, 2007). From this perspective, the value of SDVs may depend not only on technical architecture but also on whether the technology enables firms to respond more rapidly and effectively to external feedback and internal ideas. SDVs are potentially attractive because they may help firms shorten the cycle between sensing stakeholder expectations and reconfiguring the product or organization accordingly. Thus, the attractiveness of SDVs may stem not only from product performance, but from what the technology signals about a firm's capability for responsiveness and organizational adaptation.

Another important stream of literature concerns internal marketing and internal customer orientation. Internal marketing research argues that employees should be treated as internal customers whose needs, experiences, and perceptions influence organizational performance (Rafiq & Ahmed, 2000). Related research on internal customer orientation suggests that organizational communication, employee support, and internal coordination are important foundations for broader market orientation (Conduit & Mavondo, 2001). These arguments are highly relevant to SDVs because software-driven innovation depends not only on external customer acceptance but also on the willingness and ability of employees to work within responsive and collaborative organizational systems. Thus, the attractiveness of SDVs may depend not only on their product-related benefits but also on whether they signal meaningful internal processes and organizational responsiveness.

In addition to consumers, employees are therefore critical stakeholders in the commercialization of emerging technologies. Research on internal branding and internal marketing suggests that employees are not passive recipients of organizational strategies but active interpreters of organizational values and visions. When employees perceive a technology as meaningful and aligned with their expectations, they are more likely to demonstrate motivation, engagement, and advocacy for the firm (Kato et al., 2024). Employer branding research similarly indicates that employees are sensitive to signals of responsiveness, meaningful con-

tribution, and the realization of ideas (Backhaus & Tikoo, 2004). This issue is especially salient in technology-intensive industries, where younger generations and highly innovative individuals place strong emphasis on speed, feedback, and opportunities for contribution (Çoklar & Tatli, 2021). Thus, technologies such as SDVs may function not only as product technologies but also as internal value propositions that affect the attractiveness of firms to current and prospective employees.

Another important stream of literature concerns customer feedback and organizational learning. Consumers provide firms with large amounts of feedback through digital channels, and firms increasingly have the capacity to capture such feedback quickly (Nasr et al., 2014; Ibrahim & Aljarah, 2023). Prior research also suggests that the systematic collection and implementation of customer feedback is crucial for improving value creation and customer satisfaction (Fundin & Bergman, 2003). At the organizational level, customer feedback can support learning and responsiveness across departments (Wirtz et al., 2010). At the same time, organizations must respond not only to customers but also to employees, because the generation of ideas does not automatically lead to their implementation (Baer, 2012). These considerations suggest that the value of SDVs may lie not only in their technical superiority, but also in their potential to shorten the response cycle between stakeholder expectations and organizational action.

The heterogeneity of stakeholder responses can also be informed by innovation diffusion theory. Diffusion of innovations research suggests that individuals differ systematically in their openness to new technologies and that more innovative individuals tend to accept uncertainty and experimentation more readily than others (Rogers, 2003). This perspective is relevant to SDVs because value-based concepts emphasize responsiveness, adaptability, and ongoing change rather than stable technical specifications alone. Stakeholders who are more comfortable with innovation may therefore be more receptive to such value propositions. Similar logic applies to younger cohorts, including millennials and Generation Z, who have grown up in digital environments characterized by rapid feedback, continuous updating, and high expecta-

tions of responsiveness. Consequently, age-related and innovativeness-related differences may condition how SDV concepts are perceived.

At the same time, the SDV literature itself has predominantly focused on technological, architectural, and system-level questions (Bodei et al., 2023; Liu et al., 2022; Khamis & Goswami, 2025; Zhang et al., 2024). These studies provide important knowledge about development processes, software architecture, and vehicle functionality, but they offer limited understanding of how SDVs are perceived by stakeholders in terms of value. As technological differences narrow and competition intensifies, the success of SDVs increasingly depends on how their value is conceptualized and communicated rather than on technical performance alone. This suggests an unresolved gap between the engineering-oriented SDV literature and the marketing literature on value framing, stakeholder interpretation, internal marketing, organizational responsiveness, and innovation adoption.

Overall, the theoretical perspectives reviewed above serve distinct roles in this study. Brand concept and technology framing research provides the core theoretical foundation for expecting that stakeholder-facing value concepts, rather than technical descriptions alone, shape the perceived attractiveness of SDVs; this reasoning leads to *H1*. Internal marketing and employer branding research extends this expectation from consumers to employees by treating employees as active interpreters of organizational technologies and value propositions. Innovation diffusion theory and research on digital nativity provide the basis for expecting heterogeneous responses across age groups and levels of personal innovativeness; this reasoning leads to *H2-1* and *H2-2*. Besides, research on customer feedback and organizational responsiveness informs the substantive content of the value-based stimuli, which emphasize rapid feedback incorporation and idea realization, while broader perspectives such as service-dominant logic, value co-creation, disruptive innovation, and dynamic capabilities are treated as contextual background rather than as direct sources of the hypotheses. These insights have not yet been sufficiently integrated into research on SDVs, especially from the combined perspectives of consumers and employees. This gap motivates the present study.

This study aims to examine whether value-based SDV concepts increase perceived attractiveness among consumers and employees compared to technology-based concepts.

The study hypotheses are as follows:

H1: When promoting SDV, the value concept of immediately incorporating one's feedback into a product is more appealing to consumers and employees than technological superiority.

H2-1: Compared with technological superiority, a value-based SDV concept is more attractive to younger respondents, including millennials and Gen Z, than to older respondents.

H2-2: Compared with technological superiority, a value-based SDV concept is more attractive to individuals with high personal innovativeness than to individuals with low personal innovativeness.

2. METHOD

To test *H1*, *H2-1*, and *H2-2*, this study employed a randomized survey experiment using an online survey. Random assignment to experimental stimuli isolates the effect of the manipulated concept framing from pre-existing respondent char-

acteristics. The survey was conducted in Japan from July 23 to July 25, 2025, because the SDV concepts examined in this study were developed for the Japanese market and required recent evaluations from respondents relevant to both product and workplace contexts. Data were collected through Cross Marketing, Inc. (Cross Marketing, 2025), Japanese research company whose survey panel includes approximately 12.85 million participants. This panel enabled the recruitment of respondents who met the screening conditions required for concept evaluation.

Participants were screened before random assignment. For the consumer target, respondents were required to own a car and to drive at least once a month, because regular car use was considered necessary for evaluating the attractiveness of advanced automotive technology. For the employee target, respondents were required to be full-time employees in the automobile, home appliance, or IT industries, because these industries were regarded as relevant contexts for evaluating software-defined vehicle concepts from the perspective of workplace attractiveness. Eligible respondents were randomly assigned to four groups defined by target (consumer versus employee) and concept type (technology versus value). The composition of these groups is presented in Table 1. To reduce response bias, the survey was administered under the neutral title "Car Survey."

Table 1. Respondent characteristics by experimental group (%)

Group		Consumer–Technology (n = 139)	Consumer–Value (n = 138)	Employee–Technology (n = 157)	Employee–Value (n = 166)
Target		Consumer		Employee	
Concept		Technology	Value	Technology	Value
Gender	Men	52.5	53.6	50.3	56.0
	Women	47.5	46.4	49.7	44.0
Age	20s	18.7	22.5	19.1	19.3
	30s	15.8	20.3	20.4	18.1
	40s	22.3	18.8	21.0	19.9
	50s	18.7	19.6	19.7	22.9
	60s	24.5	18.8	19.7	19.9
Driving frequency	Once a month	5.0	8.7	5.1	6.6
	Once every two weeks	7.2	9.4	8.3	4.8
	Once a week	24.5	15.9	14.6	18.1
	Two-three times a week	20.1	21.0	12.7	17.5
	Four-six times a week	19.4	21.0	17.2	13.9
	Every day	23.7	23.9	42.0	39.2

Note: Values are percentages. n indicates sample size.

Participation in the survey was voluntary and anonymous. Before the survey began, respondents were informed that no blood or cell data, medical history, criminal history, or other sensitive personal information would be collected and that the data would be used only for statistical analysis and academic research. Informed consent was obtained online from all participants. Ethical approval: At Meiji University, ethical review is not required for research that does not target data on a part of the human body, such as blood or cells, or information on an individual's sensitive thoughts or mental and physical conditions.

The questionnaire was designed to correspond directly to the hypotheses of the study. After exposure to one concept stimulus, respondents evaluated the attractiveness of the presented SDV concept using the item "This SDV is attractive to me" on a 5-point Likert scale (1 = not attractive at all, 5 = very attractive). Because *H2-2* concerns individual innovativeness, personal innovativeness was measured using the item "Among my peers, I am usually the first to try out new technologies," adopted from Benleulmi and Ramdani (2022). These items were selected because they directly capture the dependent variable and moderator required for testing the proposed hypotheses. Single-item measures were adopted to minimize respondent burden in a short experimental survey. Such measures are considered acceptable when the construct refers to a concrete and singular object that is easily and uniformly understood by respondents (Bergkvist & Rossiter, 2007); global evaluation of the attractiveness of a specific SDV concept meets this condition. Because these constructs were measured with single items, internal-consistency reliability coefficients such as Cronbach's Alpha cannot be estimated; this limitation is acknowledged in the Conclusion. The survey items are reported in Appendix A.

The technology-based concept stimulus was formulated from prior SDV literature emphasizing technical superiority, while the value-based stimuli for consumers and employees were developed from the literature review and the theoretical argument of this study. Three concept stimuli were used: one technology-based concept presented to both consumer and employee respondents, and two value-based concepts tailored to consumers

and employees, respectively. All stimuli used an identical presentation format, including the same corporate brand header (Honda) and layout, and differed only in the body text. The corporate brand was explicitly displayed on all stimuli because respondents cannot realistically evaluate a product or workplace concept without knowing the firm originating it. The technology-based stimulus described expected technical impacts of SDVs; the consumer value-based stimulus emphasized real-time collection of customer feedback and rapid software updates; and the employee value-based stimulus additionally referred to the swift realization of employee ideas and the reduction of internal approval procedures. The complete stimulus cards are reproduced in Appendix B (translated from the original Japanese wording by the authors). The survey data were collected specifically for this study and have not been used in other publications.

For *H1*, mean attractiveness scores were compared between the technology-based and value-based concepts using an independent-samples t-test, and a chi-square test was conducted to examine differences in Top-2-Box attractiveness evaluations. For *H2-1* and *H2-2*, simple slope analyses were conducted based on a regression model including interaction terms between concept type and individual characteristics; unstandardized coefficients (*b*) are reported. Statistical significance was evaluated at the 5% level, and the analyses were conducted in R (Version 4.5.2).

3. RESULTS

The overall evaluation of SDV attractiveness across all participants indicates an advantage of the value-based concept over the technology-based concept. Specifically, the mean attractiveness score for the value-based concept ($M = 3.375$, $SD = 0.925$) was significantly higher than that for the technology-based concept ($M = 3.132$, $SD = 0.988$), $t(598) = 3.11$, $p = 0.002$, mean difference = 0.243, 95% CI [0.090, 0.397], Cohen's $d = 0.25$. The descriptive statistics for the four experimental groups are summarized in Table 2.

To further assess the practical significance of this difference, Top-2-Box analysis was conducted. As

Table 2. Descriptive statistics of attractiveness by experimental group

Group	n	M	SD	Top-2-Box (%)
Consumer × Technology	139	3.072	0.960	33.8
Consumer × Value	138	3.370	0.855	44.2
Employee × Technology	157	3.185	1.012	38.9
Employee × Value	166	3.380	0.982	50.6
Total (Technology)	296	3.132	0.988	36.5
Total (Value)	304	3.375	0.925	47.7

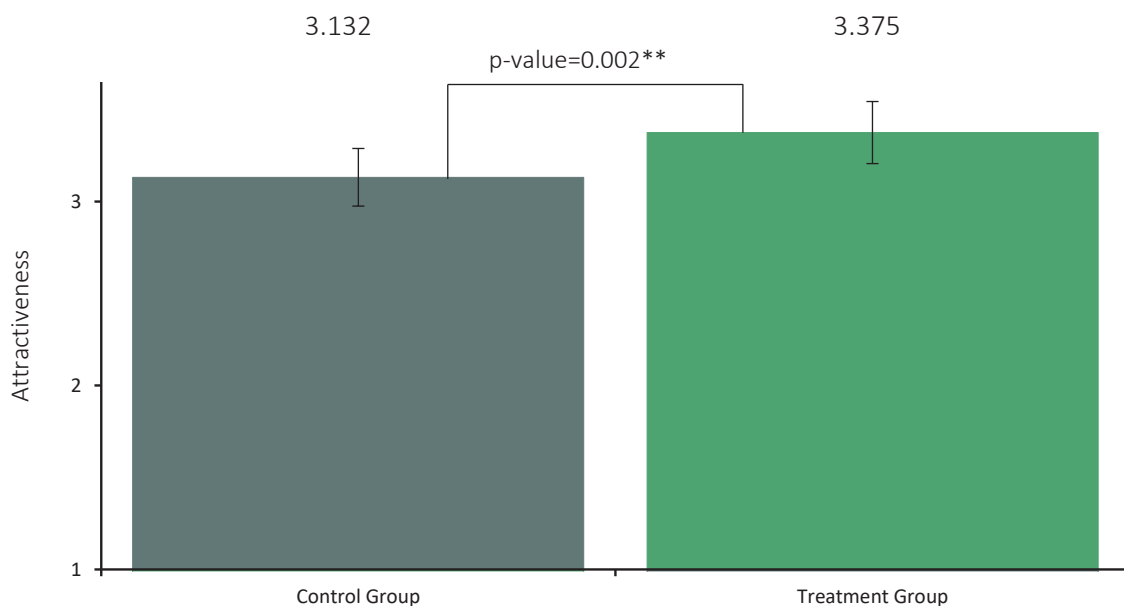
Note: Top-2-Box (%) indicates the proportion of respondents who rated the concept as 4 (attractive) or 5 (very attractive) on the 5-point scale.

illustrated in Figure 1, 47.7% of respondents evaluated the value-based concept as attractive or very attractive, compared to 36.5% for the technology-based concept. Chi-square test confirms that this difference is statistically significant ($\chi^2(1, N = 600) = 7.73, p = 0.005, \phi = 0.11$), supporting Hypothesis 1. Taken together with the mean difference reported above, these results indicate that, in this sample and under the stimuli used in this study, the value-based concept was associated with higher perceived attractiveness than the technology-based concept.

When the results are examined separately for consumers and employees, the pattern observed in the overall sample remains consistent across both groups. As shown in Figure 2, consumers evaluate the value-based concept as more attractive than

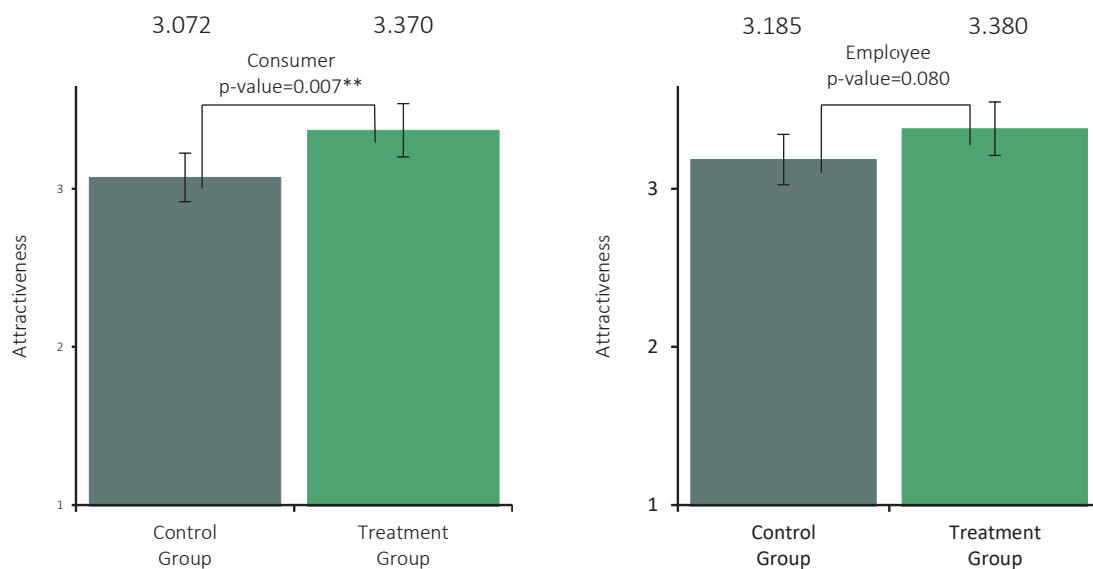
the technology-based concept, indicating that consumers respond positively to SDVs when they are framed in terms of responsiveness to feedback and continuous improvement. This finding is consistent with marketing research suggesting that consumers value technologies that reduce frustration and enhance perceived control over product evolution.

Similar descriptive pattern is observed among employees. Employees evaluated the value-based concept as more attractive than the technology-based concept, suggesting that SDVs may be perceived as more attractive when framed as platforms that enable the rapid realization of ideas and organizational agility. From an internal marketing perspective, these results are consistent with the view that SDVs can function as internal value proposi-



Note: Bars show mean attractiveness ratings on a 5-point scale; error bars indicate 95% confidence intervals.

Figure 1. Mean attractiveness ratings of SDV concepts for all respondents



Note: Bars show mean attractiveness ratings on a 5-point scale; error bars indicate 95% confidence intervals.

Figure 2. Mean attractiveness ratings of SDV concepts by respondent type

tions when technological capabilities are aligned with employees' expectations for meaningful contribution. The consistency of the descriptive pattern across consumers and employees underscores the relevance of value framing for multiple stakeholder groups.

To further examine heterogeneity in responses to SDV concepts, interaction effects between concept type and individual characteristics were analyzed using simple slope analyses. The simple slope analysis of the moderating effect of age reveals descriptive differences in how stakeholders respond to value-based SDV concepts. As reported in Table 3, among younger respondents (Mean -1 SD), the value-based concept has a positive and statistically significant simple slope on SDV attractiveness ($b = 0.302$, $p = 0.006$). In contrast, for older respondents (Mean $+1$ SD), the simple slope of the value-based concept is smaller and does not reach statistical significance ($b = 0.179$, $p = 0.106$). However, the interaction between concept type and age was not statistically significant ($b = -0.005$, $p = 0.430$), so Hypothesis 2-1 was not supported. The directionally consistent pattern may nonetheless indicate a tentative boundary condition and should be interpreted cautiously.

A similar descriptive pattern is observed for personal innovativeness. When personal innovative-

ness is high (Mean $+1$ SD), exposure to the value-based concept significantly increases perceived attractiveness ($b = 0.286$, $p = 0.006$). In contrast, when personal innovativeness is low (Mean -1 SD), the effect of the value-based concept is weaker and fails to reach conventional significance levels ($b = 0.169$, $p = 0.100$). However, the interaction between concept type and personal innovativeness was not statistically significant ($p = 0.423$); Hypothesis 2-2 was therefore not supported. The directionally consistent pattern may warrant further investigation in future research. Taken together, the non-significant interaction terms suggest that the attractiveness advantage of the value-based concept was not limited to particular age or personal-innovativeness segments in this sample.

Taken together, the results show that the pooled value-based conditions received higher attractiveness ratings than the pooled technology-based condition in this sample. However, the interactions with age and personal innovativeness were not statistically significant, and H2-1 and H2-2 were not supported. The findings therefore provide evidence for an overall difference between the specific stimuli tested, but not for systematic variation in that difference across age or personal-innovativeness levels.

Table 3. Regression results for perceived attractiveness (OLS)

Predictor	b	SE	t	p	b	SE	t	p
Intercept	3.132	0.056	56.38	<0.001	3.139	0.052	60.72	<0.001
Value concept (vs. technology)	0.240	0.078	3.08	0.002	0.227	0.073	3.13	0.002
Age (centered)	-0.002	0.004	-0.56	0.575	—	—	—	—
Personal innovativeness (centered)	—	—	—	—	0.325	0.052	6.30	<0.001
Value × Age	-0.005	0.006	-0.79	0.430	—	—	—	—
Value × Personal innovativeness	—	—	—	—	0.058	0.073	0.80	0.423
R ²	0.021	—	—	—	0.152	—	—	—
N	600	—	—	—	600	—	—	—

Note: Dependent variable: perceived attractiveness (1–5). Age and personal innovativeness are mean-centered. Unstandardized coefficients are reported. “—” indicates that the term was not included in the model. Model 1 corresponds to Hypothesis 2-1 and Model 2 to Hypothesis 2-2; the non-significant interaction terms indicate that the attractiveness advantage of the value-based concept was not limited to specific age or personal-innovativeness segments.

4. DISCUSSION

The results of this study indicate that, in the present Japanese online survey sample, the specific responsiveness-based value stimuli used in this study were rated as more attractive than the technology-based stimulus. In overall evaluations, the value-based concept achieved a higher mean attractiveness score than the technology-based concept, and the difference was also evident in the Top-2-Box analysis. This suggests that the attractiveness of SDVs is shaped not only by technological superiority but also by how the technology is translated into stakeholder-relevant value. In this respect, the findings are consistent with brand concept and value proposition research, which argues that stakeholders respond not only to functional attributes but also to the meanings attached to products and technologies (Gardner & Levy, 1955; Park et al., 1986; Payne et al., 2017). They also extend earlier studies on high-technology branding and concept recall (Hamann et al., 2007; Kato, 2021) by showing, through a randomized survey experiment, that value framing was associated with higher perceived attractiveness in the specific context of software-defined vehicles.

The findings are also in line with technology framing research, which suggests that the attractiveness of innovation depends on how its meaning is interpreted and communicated by stakeholders (Rindova & Petkova, 2007; Topaloglu & Gokalp, 2018). However, the present study goes beyond previous framing studies by identifying a specific type of value that is particularly relevant to SDVs: organizational responsiveness. In this study, the value-based concept emphasized the rapid incorporation

of consumer feedback and the swift realization of employee ideas. This is important because, unlike many conventional automotive technologies, SDVs are inherently associated with continuous updating and post-purchase evolution. Therefore, stakeholders may not evaluate SDVs only in terms of technical features, but also in terms of whether the technology enables firms to respond more quickly and meaningfully to expectations. In this sense, the present findings suggest that the perceived value of SDVs is closely linked to the speed and visibility of organizational response.

This interpretation is also consistent with research on customer feedback and organizational responsiveness. Prior studies have shown that consumers provide firms with continuous feedback and that systematically capturing and using such feedback is important for value creation and satisfaction (Nasr et al., 2014; Ibrahim & Aljarah, 2023). From this perspective, the stronger attractiveness of the value-based concept suggests that stakeholders may perceive SDVs as valuable when they are framed as reducing the delay between feedback and organizational action. The concept tested in this study appears to make the technical advantages of SDVs more understandable by linking them to a familiar frustration: the inability of organizations to respond quickly enough. Accordingly, the present results indicate that value framing works not merely because it is more emotionally appealing than technical description, but because it converts abstract technical potential into a concrete and socially meaningful benefit.

The employee-related findings further extend internal marketing and employer branding research.

Previous studies have shown that employees respond positively to meaningful work, recognition, and organizational signals that support contribution (Backhaus & Tikoo, 2004; Kato et al., 2024). The present study supports this perspective by demonstrating that employees evaluate SDVs more positively when the technology is framed as enabling rapid idea realization and organizational responsiveness. This implies that, in software-intensive industries, technology can function not only as an operational system but also as an internal value proposition. In other words, employees may interpret the meaning of a technology partly through what it suggests about the organization itself—whether it is responsive, flexible, and willing to implement ideas rather than merely accumulate them.

The simple-slope patterns provide tentative insights into potential boundary conditions. The stronger effects observed among younger respondents were directionally consistent with prior research suggesting that younger generations, including Gen Z, are more accustomed to digital environments characterized by speed, change, and rapid feedback (Çoklar & Tatli, 2021); likewise, the pattern among individuals with high personal innovativeness was directionally consistent with the idea that stakeholders who are more open to new technologies respond positively to responsiveness-based SDV concepts. However, because the interaction effects were not statistically significant, these segment differences should be regarded as tentative and warrant further investigation rather than as confirmed moderating effects. The interaction effects of concept type with age and personal innovativeness were not statistically significant. Therefore, the present data do not provide sufficient evidence that the attractiveness difference between the value-based and technology-based stimuli varied systematically across age or personal-innovativeness levels. These null interaction results should not be interpreted as demonstrating equivalent or universal effects across segments, particularly because personal innovativeness was measured with a single item.

At the same time, the findings help clarify the limitations of the predominantly engineering-oriented SDV literature. Previous studies on

SDVs have mainly focused on architecture, software integration, and system performance (Bodei et al., 2023; Liu et al., 2022; Khamis & Goswami, 2025; Zhang et al., 2024). These studies are valuable for understanding how SDVs function, but they do not sufficiently explain why stakeholders should find SDVs attractive. The present study complements this literature by showing that the market and organizational significance of SDVs depends not only on what the technology can do, but also on how its value is conceptualized and communicated. This is a particularly important distinction in contexts where technological capabilities may be difficult for non-specialists to evaluate directly.

From a managerial perspective, the findings suggest that firms should not communicate SDVs mainly through technical specifications or engineering superiority. Instead, they should define and communicate stakeholder-relevant value propositions, such as the rapid incorporation of consumer feedback and the swift realization of employee ideas. This implication is especially important for firms competing not only for customers but also for software talent. Furthermore, because the interaction effects of age and personal innovativeness were not statistically significant, may appeal broadly across the segments examined. Firms do not necessarily need to fragment their messaging strategies across different demographic or psychographic segments; instead, they can efficiently deploy a unified, responsiveness-based SDV concept to a wide range of stakeholders. Therefore, firms should consider aligning external market communication with internal employer-branding communication so that the same SDV concept functions as both a customer-facing and employee-facing value proposition.

Overall, the present study indicates that technological superiority alone is insufficient to generate strong stakeholder appeal. The competitive value of SDVs depends on how firms define, frame, and communicate that value to both consumers and employees. By showing that responsiveness-based value framing is more attractive than purely technology-based communication, this study provides a clearer explanation of how SDV concepts can create differentiation in both market and organizational contexts.

CONCLUSION

This study aimed to examine whether value-based SDV concepts increase perceived attractiveness among consumers and employees compared with technology-based concepts. In this Japanese online survey experiment, the value-based concept generated higher attractiveness than the technology-based concept in overall evaluations, indicating that stakeholders responded more positively when SDVs were framed in terms of practical value rather than technical superiority alone. This advantage was reflected not only in mean evaluations but also in the proportion of respondents rating the concept as attractive, suggesting that the difference is meaningful from both statistical and managerial perspectives within the present sample. The simple-slope patterns were directionally consistent with stronger associations among younger respondents and among individuals with high personal innovativeness; however, the interaction effects were not statistically significant, so these segment differences should be interpreted as tentative boundary conditions for future research rather than as confirmed effects. These findings suggest that the competitive appeal of SDVs depends not only on engineering performance but also on whether firms can define and communicate SDV value in ways that are meaningful to both external and internal stakeholders. From a practical perspective, firms may benefit from positioning SDVs not simply as advanced technologies but as platforms that enable the rapid incorporation of consumer feedback and the swift realization of employee ideas. Several limitations should be noted. First, the dependent variable was perceived attractiveness, which is conceptually distinct from purchase intention, willingness to pay, adoption intention, job application intention, employer choice, and actual behavior; the findings should therefore not be interpreted as evidence concerning behavioral or market outcomes. Second, the focal constructs were measured with single items, which prevents the estimation of internal-consistency reliability and may not capture the full theoretical breadth of the constructs; future research should employ validated multi-item scales. Third, the stimuli differed in length, specificity, and narrative structure (the value-based stimuli included concrete elements such as update timing), so the observed differences cannot be attributed to value framing alone with complete certainty. Fourth, the stimuli referred to a single corporate brand (Honda), and the sample consisted of Japanese online respondents; the generalizability of the findings to other brands, firms, industries, and national contexts remains to be tested. Future research should examine the response-time conditions under which feedback incorporation is perceived as valuable and incorporate potentially negative dimensions, such as cybersecurity risk, into the evaluation of SDV concepts.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Survey items

Table A1. Survey items and sources

Section	Item	Wording	Scale	Source
Screening	Car use	Do you own a car and drive it at least once a month?	Screening item	Original
Screening	Employment status	Are you a full-time employee?	Screening item	Original
Screening	Industry	Which industry do you work in?	Screening item	Original
Attractiveness	ATTR_1	This SDV is attractive to me.	5-point Likert scale	Original
Personal innovativeness	INNOV_1	Among my peers, I am usually the first to try out new technologies.	5-point Likert scale	Benleulmi and Ramdani (2022)

Note: Respondents were randomly exposed to one of the concept stimuli before answering the attractiveness item. Screening items were used to identify eligible participants for the consumer and employee target groups.

APPENDIX B

Experimental stimulus cards (English version; translated from the original Japanese wording by the authors)

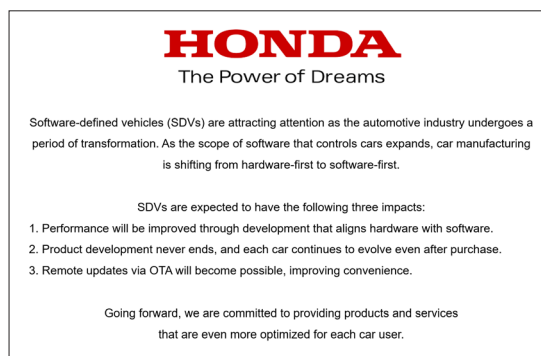


Figure B1. Technology-based concept stimulus (presented to both consumer and employee groups)

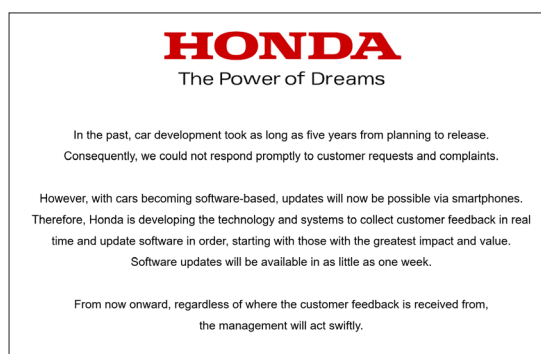


Figure B2. Value-based concept stimulus for consumers

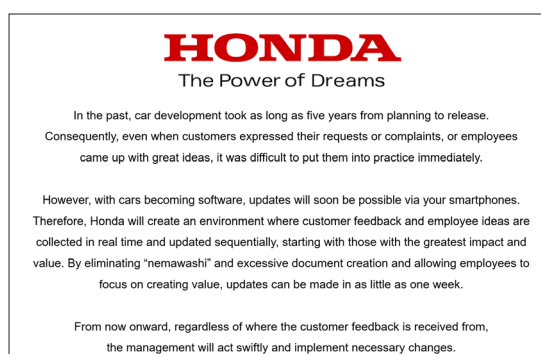


Figure B3. Value-based concept stimulus for employees

Note: All stimuli were presented in an identical visual format, including the same corporate brand header (Honda) and layout; the conditions differed only in the body text. The stimuli were originally presented in Japanese and translated into English by the authors for reporting purposes.